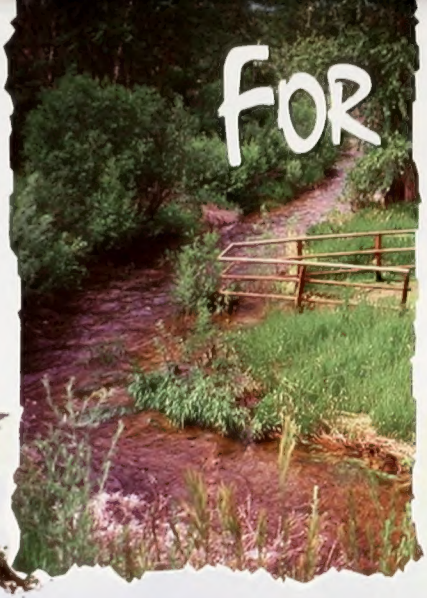
Tips on LAND & WATER MANAGEMENT



FOR SMALL FARMS & RANCHES IN MONTANA

WHY Is Land and Water Conservation Important To You & Montana?

Montana is a great place to live, and you can help keep it that way!

ARE YOU RAISING HORSES and wondering why you are having to buy more feed each year as your land's productivity declines, leaving bare ground and weeds?

HAVE YOU HAD THE GOOD FORTUNE to buy a place on a creek and are now frustrated that you aren't permitted to remove the brush so you can see the water?

DID YOU JUST FIND OUT that those pretty purple flowers along your fence are noxious weeds and threaten the productivity of your land and your neighbor's land?

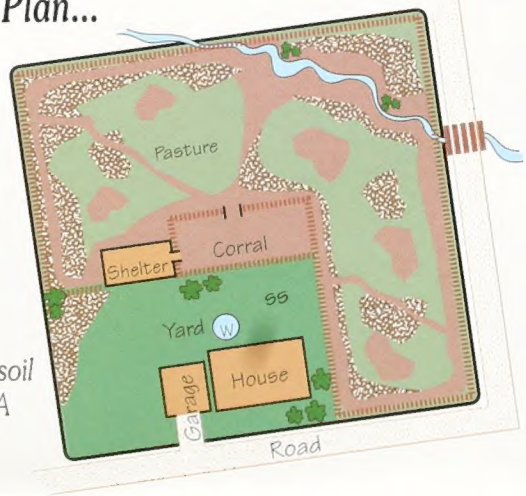
As you can see, there's a lot to know about owning and managing land, and you need to know even more if you're raising livestock, too. This booklet will get you started and give you lots of information and ideas for your place. With a little time, a little knowledge and not a whole lot of money, you can have a "picture perfect" place that you can be proud of...and protect Montana's land and water. Remember, we're all part of a neighborhood and our actions can affect others. Refer to the last page for information on how to avoid contamination and infringement on others' rights. The things that you and your neighbors do can greatly improve the health of our resources...the resources we all appreciate about Montana.

Look At What You Have

Any landowner needs a management plan. Before developing your plan - look around, make a sketch, and take a few notes about your property. In your sketch, show or note:

- *Property boundaries*
- *Fences and corrals*
- *Buildings*
- *Wells (human or stock)*
- *Septic system*
- *Streams, wetlands, ponds*
- *Bare ground*
- *Weeds*
- *Lawn, pasture, or crop land*
- *Trees or shrubs*
- ✔ *Soil type (refer to your county soil survey available from the USDA Soil Conservation Service)*
- ✔ *Depth to groundwater*

Before You Plan...



Con$ervation Value$

Saves money because your land is more productive over the long term

Ensures better water quality for you, your animals, and your neighbors

Provides wildlife habitat

Produces more grass for grazing

Grows healthier livestock

Improves your property values

Makes your place more attractive

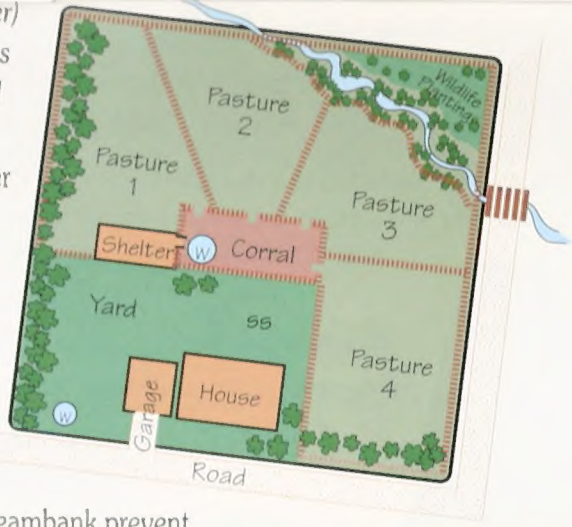
Keeps your neighbors happier

Satisfies your responsibility to care for the land

(check with well driller)

- ✔ *Neighboring land uses*
- ✔ *Flat or sloped ground*

The four pastures in this "After" drawing allow better management of livestock grazing and increased forage production. A **stockwater tank** located in the corral is accessible from all pastures and reduces streambank trampling. Shrub and tree plantings along the streambank prevent erosion, replace weeds and bare areas, and provide wildlife habitat.



After You Plan!

What Are Your Property Goals?

What do you want?

What can your land support?

Livestock grazing? How many?
Wildlife habitat?
Good water quality?
Fish?
Healthy forest?
Native plants?
A 4-H project?
Something else?

You may find that you have to modify some of your goals because they are not realistic for your property.

MAKE

A Plan For Your Land

Once you've looked at your property and identified your goals, you need to develop a management plan for reaching your goals. Remember, even if you like things just the way they are, you will need to ***do something*** *to keep weeds from coming in or to keep the water clean! This booklet provides useful information on developing the many different parts of your management plan.*

Contents

Quiz Give Your Land A Health Exam

How much of these do you have on your property?

	1	2	3
Healthy ground cover (forest, shrubs, grass, or cropland)	*A lot*	*Some*	*A little*
Weeds or plants that hold the soil poorly (dandelion, knapweed, cheatgrass)	*A little*	*Some*	*A lot*
Bare ground	*A little*	*Some*	*A lot*

If all of your answers are in the first column, your land earns an "A" for health. If most of your answers are in the second column, it is in average condition. If you have any responses in the third column, your land needs immediate ***help****! Read on to learn about conservation practices that will improve your land's health.*

Weed Control

Weeds spread fast so regularly look for new weed patches on your property and act immediately to treat them by using one or more of the weed control practices listed below. Team up with neighbors to improve effectiveness. Remember, weed control by itself is not enough. It is also necessary to modify the practices that caused weeds to become established in the first place!

Prevention. Good land management will help keep desirable vegetation healthy and weeds under control. Buy only weed-seed-free hay, plant only certified seed, wash your vehicle after being in a weed-infested area, monitor your property, and respond quickly to any new weed infestations.

Biological. Biological control attempts to find something in nature that can weaken or eventually kill a weed plant. Successful bioagents include certain fungi and insects that weaken weeds by attacking seed heads and other plant parts.

Mechanical. Mow weeds annually before they go to seed. Pull small weed patches and weeds near streams by hand.

Livestock Grazing. Graze weeds before they go to seed using sheep, goats, or cattle. Because livestock and wildlife can easily carry and spread weed seed on their coats or in their feces, avoid moving livestock from a weedy area to a weed-free area. Some weed species, if eaten, will make livestock sick.

Is Your Soil Covered?

...not by insurance, but by vegetation! Vegetation protects the soil from erosion by rain, runoff, and wind. Vegetation increases water uptake by soils and holds soils in place on slopes and along streams.

How Fertile Is Your Soil?

You'll need a soil test to find out. Contact your local Soil Conservation Service or county extension office to find out how to take a soil sample and where to send it for testing.

Know Your Weeds Before They

- Choke out desirable forage for livestock and wildlife
- Reduce the productivity of your pasture and land
- Cause water pollution and soil erosion because they're less effective at holding the soil
- Spread RAPIDLY!

Knapweed (Spotted, Russian, and Diffuse)

Leafy Spurge

Whitetop

Chemical Herbicides. Herbicides may be expensive, but are effective when applied in the proper amounts and at the proper time of year. **Read the label** instructions carefully and follow directions. Use chemicals away from water to prevent adverse health effects to you and your animals and to prevent pollution of streams and groundwater. Only licensed users can use restricted herbicides. Call a local farm supply store to find out about hiring custom chemical applicators to spray your weeds. Be sure herbicide will not reach and kill desirable trees and shrubs. **Properly** dispose of leftover chemicals.

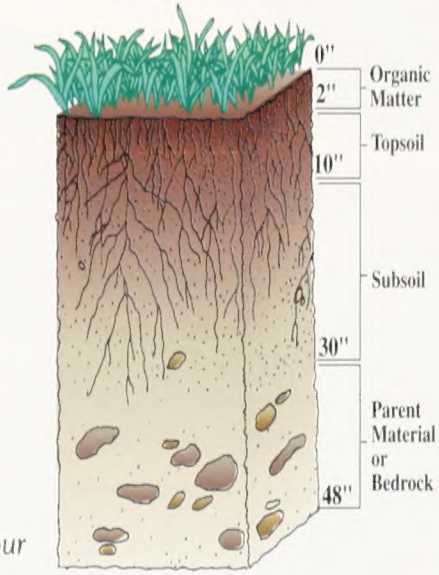
TYPES - Know Your Soil

Soils vary widely, even across your backyard. The type of soil you have will influence:

- What type and how much grass or crops your land can produce
- How quickly water moves through the soil
- If the soil will filter human and animal wastes before they reach groundwater
- How often you need to irrigate
- How much fertilizer is needed
- Possible problems with building foundations
- If the area is a wetland

For information about your soil type, refer to your county's soil survey available from the Soil Conservation Service (SCS) office (listed in your phone book under United States Government, Dept. of Agriculture).

A Soil Profile:



For Help Contact your county weed control district or county extension office to obtain a list of noxious weeds in your local area and recommendations on how best to control them.

Dalmation Toadflax

Canada Thistle

Purple Loosestrife

Sulfur Cinquefoil

To distinguish from other native cinquefoils, note that sulfur cinquefoil has many stem leaves, few basal leaves, and long, right-angled hairs along stems.

WHAT Is Your Annual Pasture and Hay Production?

	Fertile Soils		Poor Soils	
	Feed (Hay) tons/acre	Forage AUMs/acre	Feed (Hay) tons/acre	Forage AUMs/acre
Irrigated	2-4	3-4	less than 2	1-2
Nonirrigated	1-2	1-2	.5 or less	.5
Rangeland/woodland	1	.5	.5 or less	.25

These figures are averages and may vary up or down, depending on management.

TIPS To Increase Your Pasture Production

A pasture is a grazing area for animals enclosed by a fence. Pastures are often planted to nonnative plant species to increase their production. These pastures may need fertilizing, irrigating, and periodic replanting.

- *Develop irrigation (if you have a water right, see page 9). Practice irrigation water management. Under-irrigating will shorten the life of your pasture; over-irrigating wastes energy, water, and your time.*
- *Fertilize according to SCS and soil test recommendations. Believe the soil test! Overfertilizing is not better and can damage water quality.*
- *Mow pastures to a uniform 3-inch height after grazing to stimulate equal growth of all plants.*
- *Drag or harrow to spread nutrient-rich manure.*
- *Control weeds.*
- *Reseed. Contact your local SCS office to determine the most productive seed mixture for your purpose and location.*

Irrigation Systems

Advantages and Disadvantages

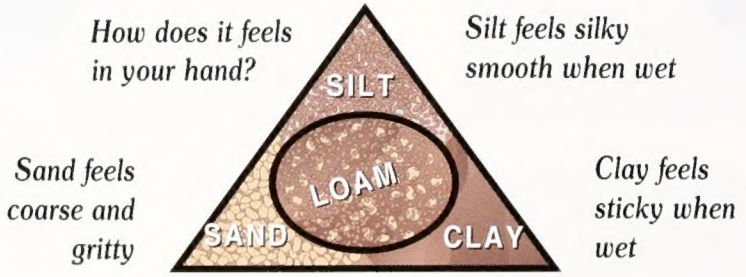
Sprinkler irrigation (includes moveable handlines, moveable wheel line, and center pivot) uses the least amount of water, requires labor to move the irrigation pipe, requires some maintenance, and requires an initial investment. Some operational costs are possible.

Flood irrigation requires lots of water, doesn't spread water evenly across the pasture, requires labor to turn water on or off a pasture, is low maintenance, and is the least expensive (assuming irrigation ditches are already in place).

"Big gun" sprinkler irrigation requires high power costs, applies excess water, and doesn't work well on clay-type soils. Water distribution is only fair and cost is moderate. Minimum labor and some maintenance are required.

Irrigation Management

Depends on Soil Texture



Loam is a combination of all of these.

Irrigation *How Much and How Often?*

Soil	Moisture to be replaced in the 3-foot rooting zone	Average Peak Season (July/August)

Consider Custom Farming As A Way To Improve Your Pasture

Many landowners find it too expensive to own their own farm equipment for preparing the soil, seeding, harvesting, or baling. Ask your neighbors if they know of any custom farmers or ranchers in the area who will follow your instructions for improving your pasture.

Texture	When soil is at 50% of its water-holding capacity*	Irrigation Frequency
Loamy sand	1.4"	6 days
Sandy loam	2.3"	9 days
Loam	3.1"	12 days
Clay loam	3.2"	13 days
Clay	3.1"	12 days

** These moisture replacement estimates are for an alfalfa/grass hay crop. Amounts may vary for other crops. Irrigation is most important for alfalfa during the seedling stage and immediately after cutting. If your soil depth is less than 3', you'll need to irrigate more often and apply less water.*

Q: When do I need to irrigate?

A: Irrigate when the soil moisture drops to about 50 percent of its water-holding capacity in the top 3 feet of soil. Check your soil moisture by squeezing several handfuls of soil taken at 6", 12", and 18" depths in your field. Irrigate before the soil at the 18" depth begins to crumble in your hand, since most of the plants' roots are above 18".

If there is staining on your fingers from squeezing the soil, wait a couple days and test the soil again. If the soil feels only slightly moist, forms a slightly crumbly ball when squeezed in your hand, and there is no staining, then it is time to irrigate (see picture).

For Help The USDA Soil Conservation Service, an irrigation company, or a consultant can provide assistance in designing an appropriate irrigation system for your property.

Q: How long should I irrigate?

A. In general, irrigate sandy soils for short periods (2-3 hours) and clay soils for longer periods (9-12 hours). Ask your farm supply store or local SCS office to recommend the correct size spray nozzle for your soil type and your irrigation system. When it rains, see if the rain has gone deeper than the soil surface before considering it a source of water for your crop.

To determine exactly how long to run your system, first place several pans at various locations under your sprinkler system. Run the system for one hour. Average the depth of the water in the pans. This is your hourly application rate. Next, divide the inches of water to replace by the hourly application rate.

EXAMPLE: Loam needs 3.1" of water replaced in the top 3 feet when it is at 50 percent of its water-holding capacity (see irrigation table). If your irrigation system's application rate is 0.3"/hour, you will need to run your irrigation system for ten and a half hours to deliver 3.1" to the soil, since 3.1" ÷ 0.3"/hour = 10.5 hours.

Quiz Are Your Grazing Animals Properly Managed?

	Y	N
Do you have so little grass in your pastures that your animals consume dirt while trying to graze?		
Are your animals browsing on trees, shrubs, fences, or barns?		
Are your animals losing weight, or are they overweight?		
Do your animals have scruffy coats?		
Are your animals prone to colic or respiratory problems?		

*If you answered "yes" to **any** of these questions, you need a new grazing program that will provide more grass and healthier animals... and save you money in lower feed costs and lower veterinarian expenses!*

Grazing Management Produces More Grass

Continuous grazing allows weeds to grow where grass roots have been weakened. A less dense leaf canopy allows sunlight to reach invading weeds.

Pasture rotation and good grazing management produces more grass, fewer weeds, and no bare ground.

Tips For a Successful

Do You Have Enough Feed and Forage For Your Livestock?

In Montana, livestock are usually grazed May through October during the plants' growing season (if you have enough pasture) and fed hay from November through April.

Forage is what your animals consume by grazing. Forage production is measured in animal unit months (AUMs). One AUM is equivalent to the amount of forage consumed by a 1000-pound animal in one month.

Feed is the hay that you provide an animal when forage is not available. Hay production is measured in tons per acre.

Q. How much feed and forage do your animals need each year?

A. Average requirements are listed below, but may vary with season, level of use, and the age and size of the animal.

	Feed (hay) Tons/month	Forage AUMs of grazing/month
1 cow	.4	1.2
1 horse	.5	1.25
1 sheep	.1	.2
1 llama	.15	.3
1 goat	.1	.2

Q. How much feed and forage can your land produce?

A. See Pasture and Hay Production table on page 3.

Q. Do your feed and forage requirements balance with your land?

A. To find out, do your own calculations following these examples:

Feed Requirement: 3 horses x $\frac{.5 \text{ tons}}{\text{month}}$ x 6 months = 9 tons hay

Feed Production: 10 acres (fertile nonirrigated soil) x $\frac{1 \text{ ton}}{\text{acre}}$ = 10 tons hay

Forage Requirement: 3 horses x $\frac{1.25 \text{ AUMs}}{\text{month}}$ x 6 months = 22.5 AUMs

Forage Production: 10 acres (fertile nonirrigated soil) x $\frac{1 \text{ AUM}}{\text{acre}}$ = 10 AUMs

In this example, your land will produce enough hay to feed your animals for 6 months. However, you do not have enough forage (grazing) to meet your animals' needs. To avoid overgrazing your pastures each year:

Grazing Program

- *Eliminate continuous season-long grazing.*
- *Subdivide large pastures into smaller pastures (see sample grazing designs on next page) and develop a pasture-rotation grazing system.*
- ***Corral livestock and feed them hay until your pasture grasses are 6" to 8" high. Move livestock when 50% of the grass plant has been eaten (3" to 4" height remains). Do not regraze until grasses are at least 6" high (will take 1 to 3 months).***
- *During winter months, continue your rotation to distribute manure and feed wastes evenly across your pastures or hold animals in a corral.*
- *Allow long rest periods or use a high-intensity, short-duration grazing system to rejuvenate poor condition pasture.*
- *Provide a water source for each pasture (see next page).*
- *Irrigate each pasture (if you have irrigation) immediately after grazing to get plants growing again. Do not graze on wet soils.*
- *Horses do not need 24-hour access to feed or forage. Their nutrition needs can be met with only a few hours of grazing on good pasture each day. Corral animals for the remainder of the day to prevent overgrazing of plants and extend the forage available in your pastures.*
- *On a limited acreage, you may have only enough pasture to exercise your animals and will need to feed year-round.*

Poor Condition Pastures Cause

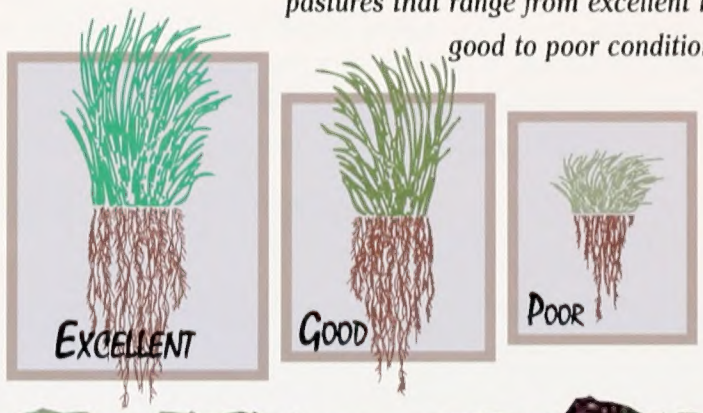
- colic and respiratory problems from eating dirt
- weight loss
- parasites
- poor coat

- Buy additional feed or rent pasture
- Increase your pasture production (see "tips," previous page)
- Improve your grazing management
- Reduce your number of animals
- Seek assistance

How Grazing Affects Root Growth

	Percent Grass Plant Removed	Percent Root Growth Stopped
Overgrazing occurs when more	10%	0%
than 50 percent of the grass	20%	0%
plant is removed all at once.	30%	0%
Overgrazing stops root growth	40%	0%
and reduces grass production.	50%	2-4%
Look what happens when you	60%	50%
try to sneak in another 10	70%	78%
percent "harvest"---50 percent	80%	100%
of the roots stop growing!	90%	100%

Notice how the root mass of these grasses decreases in pastures that range from excellent to good to poor condition.



SAMPLE Grazing Schedule

For A One Herd Multiple-Pasture System

In Montana, livestock are normally grazed May through October during the plants' growing season. Begin grazing when plants are 6" to 8" in height. Move livestock after 50 percent has been eaten (3"- 4" remains). A minimum of 30 days is needed between grazing periods on irrigated pasture and up to 3 months for nonirrigated pasture. You may need to corral livestock and feed them hay until the pasture regrows.

	MONTHS											
Pasture	M	J	J	A	S	O	N	D	J	F	M	A
1	G		G		G							
2		G		G		G						
3			G		G		G					
4				G		G						

Graze *Rest* *Provide feed/hay*

Stockwater Development

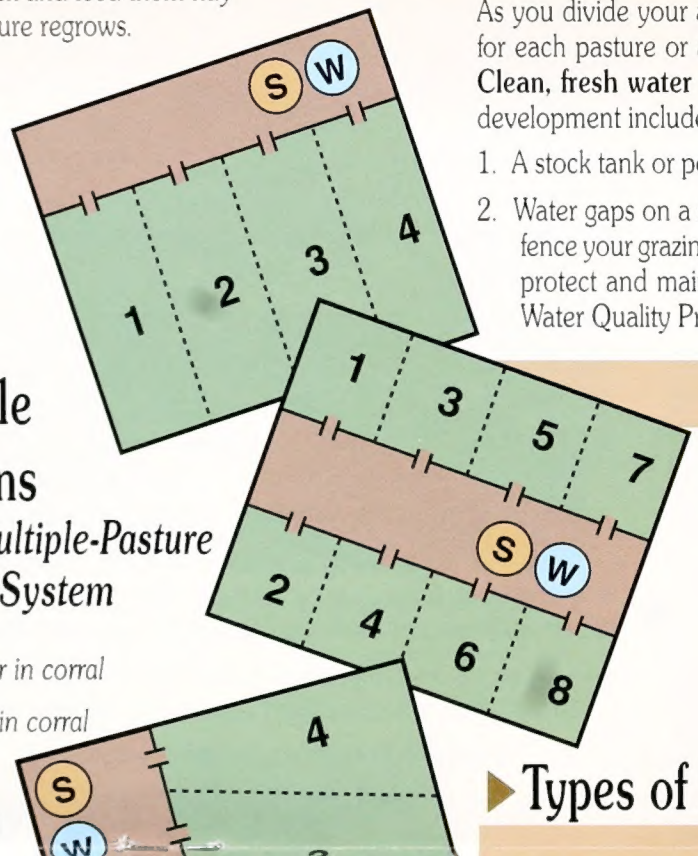
An Essential Part of Your Grazing and Animal Health Programs

As you divide your acreage into several pastures, establish separate water sources for each pasture or a single water source that is accessible from several pastures.. **Clean, fresh water is essential for good animal health.** Options for stockwater development include:

1. A stock tank or pond (consider how you will keep water from freezing in winter).
2. Water gaps on a stream. For small acreages, it is highly recommended that you fence your grazing livestock away from streams to keep manure out of the stream, protect and maintain streamside grasses and shrubs, and control erosion (see Water Quality Protection on page 9).

Sample Designs

For A Multiple-Pasture Grazing System



- (S) *Shelter in corral*
- (W) *Water in corral*
- *Gate*
- *Corral*

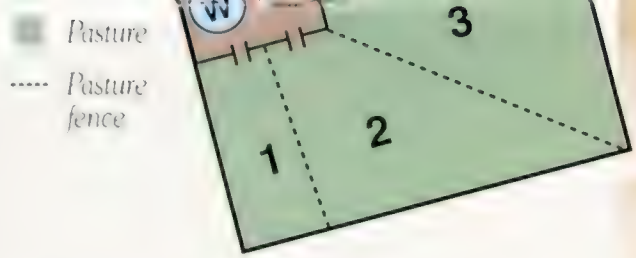
For Help

Obtain publications from county extension offices on livestock production, farming, gardening, and 4-H programs.

Assistance is available from the USDA Soil Conservation Service, conservation districts, and private consultants to:

- *Design a grazing system*
- *Increase hay and pasture production*
- *Design a livestock waste disposal program*
- *Design stockwater developments*
- *Help you meet water quality standards*

Types of Fencing

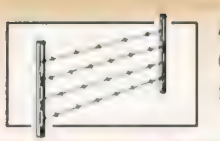
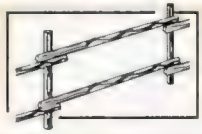
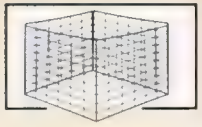


FENCING A Grazing Management Tool

Choosing The Right Fence

There are many types of fences. Each has advantages and disadvantages. No single factor determines the best type of fence to use. When selecting a fence, consider:

- Purpose (type of animal you're keeping in or out)
- Type of soil material (rocky or deep loam)
- Terrain
- Material and labor costs for construction
- Availability of power
- Maintenance requirements
- Weather
- Visual impact

	Advantages	Disadvantages
	**4-STRAND BARBED WIRE** Good control of cattle. Skill and design for construction readily available	Barbed wire may be injurious to horses and llamas. Labor and material costs high. Periodic maintenance required May be damaged by big game
	**WOVEN WIRE** Skill and design for construction readily available. Good control of sheep. Add 2 upper strands of barbed wire for cattle	Labor and material costs high. Some maintenance necessary
	**4- to 10-STRAND SMOOTH WIRE** 4- to 5-strand good for horses. 8- to 10-strand will contain large, exotic animals or keep big game out. Durable	Labor and material costs high. Periodic maintenance required
	**ELECTRIC** Good for establishing pasture rotation program on small acreages. Lightweight, portable, easy to set up or dismantle before and after irrigation. Less expensive	Weathers poorly. Don't use in lengths over 1,000 ft. Requires regular maintenance. Needs solar or electric power source
	**JACKLEG** Aesthetically appealing. Very durable. Withstands heavy snow. Good in areas where it is hard to dig or drive posts Can be adapted for marshy, wet areas Low maintenance	High labor and material costs during construction.
	**POST AND POLE (RAIL FENCE)** Durable. Withstands heavy snowfall. Low maintenance	High labor and material costs
	**HOG PANELS** Can be formed into a small, portable pen. Wheels may be attached to make moving easier. Good for establishing rotation grazing for a couple animals on small acreage	Inexpensive and easy to construct. Appropriate for only a few sheep or other small animals. Should be moved once or twice each day

Quiz How Safe is Your Drinking Water?

	No	Yes
Do you have a drainfield or livestock corral less than 100 feet from your drinking well or stream?		
Are your streambanks bare of vegetation, eroding, or falling into the stream?		
Do your well tests show fecal or nitrate contamination?		

If you answered "yes" to any of these questions, you will want to take immediate action to correct the problem. Get help!

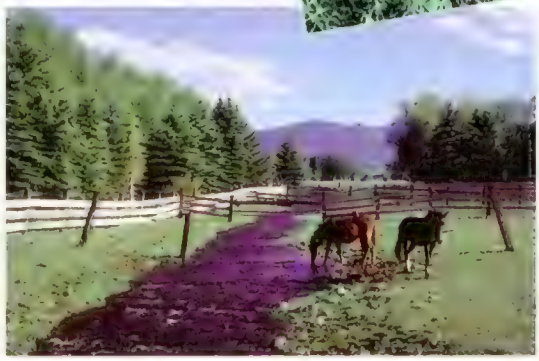
Uncertain About the Safety of Your Drinking Water?

The ***Farm *A* Syst*** program allows you to assess the potential effects of various farmstead practices on your drinking water supplies. In addition to twelve do-it-yourself worksheets, the program provides suggestions for how you can modify your practices and where to go for help. The quality of your drinking water can affect farm values, as lenders consider the cost of corrective actions or cleanup in sale prices. Contact your county extension agent for more information.

Tips To Prevent Water Pollution

Riparian Areas

are found along streams, lakes, and wetlands. They are comprised of water-loving plants such as alder, willow, cottonwood, and sedges.



Continuous season-long grazing often removes important riparian vegetation and may cause streambank erosion and water quality degradation.

These areas make up less than 5 percent of the landscape, yet contain 75 percent of our plant and animal diversity: turtles, beaver, muskrat, wood duck, songbirds, frogs, insects, aquatic organisms, orchids, lilies, and more. **Just about everything you like about these areas depends on leaving them in their natural state.**

A Healthy Riparian Area

is the key to a healthy stream system. Lush riparian and wetland vegetation along the water's edge will:

Slow flood flows and reduce erosion and property loss

Secure food and cover for fish, birds, and other wildlife

Keep water cooler in the summer and prevent ice damage in winter

- *Establish and maintain shrubs and grasses along streams and around animal confinement areas to trap and absorb pollution laden runoff before it reaches streams or groundwater*
- *Locate corrals and other livestock confinement areas away from streams. Use water gaps or off-stream stockwater tanks to minimize livestock trampling of streambanks.*
- *Avoid over-irrigation that can cause valuable topsoil, fertilizer, and pesticide runoff.*
- *Properly dispose of manure, feed, and bedding wastes by spreading on your cropland. Be sure soil is not too wet or frozen to absorb wastes. This will reduce your need for expensive commercial fertilizers.*
- *Locate corral and septic system downslope of your drinking water well.*
- *Use farming practices that reduce soil erosion and increase water infiltration, such as: minimum tillage, contour farming, filter strips, and grassed waterways.*
- *Do not mix, apply, or dispose of weed control chemicals, used motor oil, or other toxic substances near streams or where they can leak into groundwater. Contact your county health department for the best method of disposal in your area.*

Reduce water pollution by filtering out sediment, chemicals, and nutrients from runoff

Provide important breeding habitat for birds

Shelter animals during calving, lambing, or fawning

Hold more water in the soil, slowly releasing it for longer season streamflows and groundwater recharge

Does Your Property Have A Wetland?

Wetlands are protected from land management activities that would destroy them or change their function. Wetlands are determined by specific soil, vegetation, and hydrologic characteristics. Contact the Soil Conservation Service to determine if your wet area is a wetland.

For Help

- The U. S. Fish and Wildlife Service's Private Lands Program funds projects that create, enhance, or restore wetlands (761-5450).
- The Montana Department of Fish, Wildlife and Parks' River Restoration Program funds stream corridor improvements, including fencing and bank stabilization (444-2449).
- County extension offices have lots of water publications, including information on how to test your drinking water quality.
- Request the *Guide to Stream Permitting in Montana* from your conservation district. It lists the laws that must be complied with before initiating any activity in or near a stream, lake, or wetland.
- The Montana Department of Health and Environmental Sciences in Helena will answer questions about state and federal water quality laws (444-2406).

Quiz Is Your Property Attractive to Wildlife?

	Y	N
Are there a variety of vegetation types, such as small grains, tall grasses, shrubs, and trees for food? For cover?		
Is there a pond, stream, or stockwater tank available to wildlife?		
Can wildlife avoid predation from domestic animals, such as cats and dogs?		

The more "yes" responses you had, the more likely you will enjoy the company of birds, small mammals, and maybe even deer and elk.

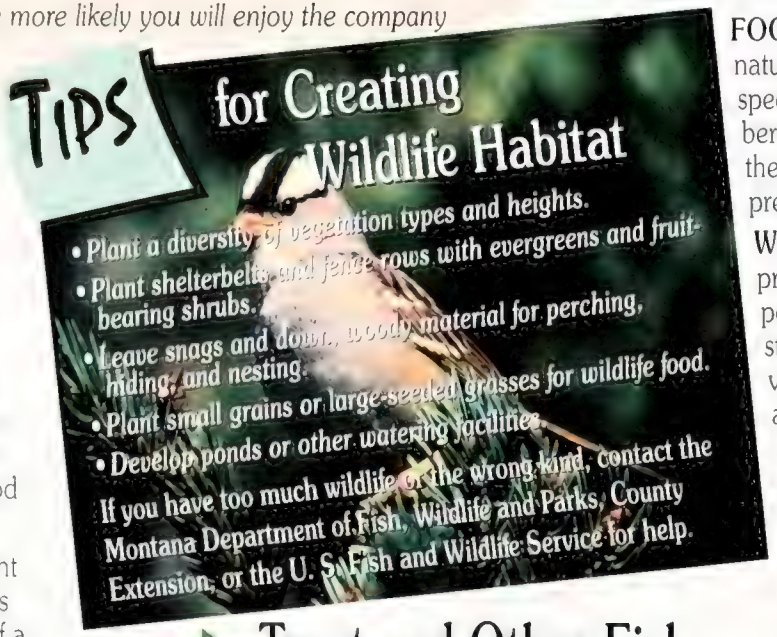
Wildlife Habitat = *Food+ Water+Cover*

Wildlife habitat is being lost as more land is subdivided, bringing houses, people, livestock, dogs, cats, and other intrusions. Landowners can help offset this loss of wildlife habitat by growing a diversity of vegetation that provides food and cover for wildlife.

FOOD requirements will naturally vary by wildlife species, from the seeds and berries required by birds, to the grasses, forbs, and shrubs preferred by deer and elk.

WATER on or near your property in the form of a pond, stream, or developed stockwater will increase the variety of wildlife you can attract.

COVER is needed for hiding from predators, travel corridors, nesting, and shelter.



Upland Game Birds

Provide food. Areas of tall grass, thickets of shrubs, and plots of wheat, barley, and other small grains provide food and habitat diversity for pheasants and other upland birds. When harvesting crops, begin cutting from the center of the field outward to flush birds away. Don't worry about water. These birds get moisture from dew and the food they eat.

Provide nesting areas and cover. Plant tall grass along roadsides and ditchbanks and shrubs along fencelines or as part of a windbreak to provide nesting and cover. Since these birds nest on the ground in the spring, avoid mowing, burning, or using weed control chemicals on your tall grass until birds are out of the nest in mid-June. (Some weeds should be sprayed prior to June 15 to control their spread effectively, so weigh your priorities.)

Trout and Other Fish

Provide food and cover. In small streams, the majority of "fish food" comes from the insects and leaves that fall into the stream from overhanging vegetation. Overhanging shrubs, sedges, and grasses also help to keep water temperatures cool in summer and reduce icing in winter.

Provide habitat . Fish need riffles and deep pools to meet all of their food and cover needs at different stages in their lives. The rocks found in riffle areas churn up the water, which adds oxygen and carries insects to the fish hiding behind rocks or under overhanging banks. Deep pools provide the coldest, most-oxygenated water in summer and are least likely to freeze in winter, killing fish.

Song Birds

Provide food and water. Trees and shrubs can provide seeds, fruits, and berries that birds like Streams, ponds, or stocktanks can provide water Place a floating board in stocktanks to prevent birds from drowning while watering

Provide nesting areas and cover. Song birds require a diversity of vegetation heights (tall grass, shrubs, trees) and a variety of foliage densities (evergreen and deciduous trees) for nesting and safety from predators. Perches of different heights, such as old snags, fences, and telephone poles, are used by many birds (from bluebirds to hawks) for resting and searching for food.

Waterfowl

Provide food. Waterfowl like aquatic plants, small insects, snails, and crustaceans. They also feed on grains and forage

Provide water. Ponds are a natural for attracting ducks, geese, and other waterfowl. Ponds should have shallow and deep areas and well-vegetated banks. Vegetated islands are the safest and preferred for nesting.

Provide nesting areas and cover. Large 40- to 50-acre areas of tall, dense, undisturbed vegetation near open water are needed for successful nesting. A tangle of dead plants from last year's growth will hide nesting hens from predators. This dense, dead vegetation also creates better temperature and moisture conditions for egg hatching.

Deer and Elk

Remember, attracting large wildlife may also mean damage to gardens and ornamental plants. More deer and elk around your home may also attract predators, like mountain lions.

Provide food. Deer and elk are primarily grazers, but also browse on trees and shrubs Creating openings in the forest will increase grass and shrub growth for big game. In winter, deer and elk look for windblown areas where grasses are exposed— that may be **your** pasture! After feeding, elk and deer look for thickets of shrubs or stands of trees to rest and stay warm.

Provide cover. When deer and elk feed in the open, they like being no more than 600 feet from trees and brush for hiding. Consider maintaining large areas of dense shrub or trees on your property for hiding and shelter, especially near pastures. Areas of dense timber are cooler in the summer and warmer in winter than open areas. If you want to accommodate deer and elk and need a fence, build a low one with a smooth top wire. This is easier for them to cross.

For Help

• To develop a plan for improving wildlife habitat on your property, contact your local USDA Soil Conservation Service office, conservation district office, or visit your library or local bookstores.

• Order trees and shrubs that wildlife prefer from the Montana State Nursery (if you own more than ten acres) or ask your local nursery to suggest some native shrub and tree species adapted for your area.

• Information on pond development is available from the Montana Department of Fish, Wildlife and Parks and the USDA Soil Conservation Service.

• The Montana Department of Fish, Wildlife and Parks has an Upland Game Bird Program that provides limited funding to property owners who want to improve habitat for pheasants and other upland game birds. Program participants must allow some public access for hunting on their property.

Quiz Is Your Forest Healthy?

	Y	N
Are your trees free of problem insects, diseases, or animal damage?		
Are your trees spaced far enough apart to allow some sunlight to reach the plants growing on the ground?		
Is there more than one age or size of tree present (e.g., seedling, pole, mature)?		
Is there more than one tree species present?		
Do you have scattered, rather than piles of, down woody material?		

If you had all "yes" answers, your woodlot is looking good. If not, read on...

Protect Your Home from Wildfire

Maintain 30' of green lawn or fire-resistant plants around your home.

Prune the lower branches of trees below 12' to remove "ladder fuels" that can cause a ground fire to become a more destructive and harder-to-control crown fire.

Have water and fire-fighting tools available.

Avoid using wood shakes for roofing or storing firewood next to your house.

Contact a USDA Forest Service or Montana Department of State Lands office for publications and videos on protecting homes from wildfire.

Forest Insects and Disease

■ Problem ▲ Vulnerable Trees

▲ Grand fir, subalpine fir, species of pine > 6" diameter; spruce or Douglas-fir > 14" diameter

■ Pitch tubes or mass of sap on bark surface or mounds of red-orange boring dust on bark

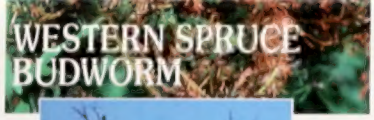
▲ Lodgepole, ponderosa pine, and white pine

■ Gall rust forms large swellings on branches and trunks. Blister rust cracks bark open in spring, exposing yellow or orange powdery spores.

▲ Grand fir, subalpine fir, and Douglas-fir

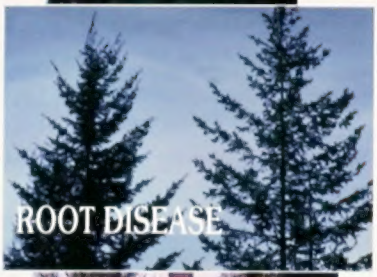
Tips for a Healthy Forest

- *Maintain diverse species and ages of trees.*
- *Reduce losses of trees to problem insects and diseases by removing infected trees and slash as soon as possible.*
- *Thin trees to improve growth, health, and vigor. Thinning will also increase forage. Leave the largest and healthiest trees.*
- *Avoid season-long livestock grazing that can compact soils and damage trees from browsing or rubbing.*
- *Locate access roads away from streams; construct adequate drainage. Seed cut slopes promptly to reduce erosion and water pollution.*
- *Dispose of heavy accumulations of down woody material to reduce fire hazard. Leave snags (standing dead) and larger downed logs for wildlife and forest nutrient cycling.*
- *When controlling weeds with chemicals, take special precautions not to kill trees.*
- *When planting trees, select species adapted to your soil, climate, and*

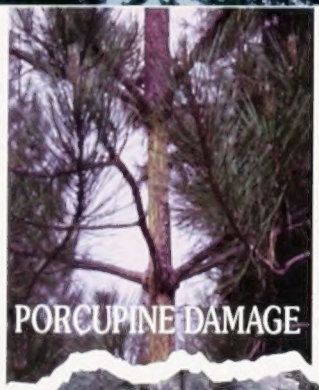


- Initially, silky webbing in needles; followed by chewed needles turning brown at tips of branches

- Mostly Douglas-fir, lodgepole pine, and larch
- Witches-brooms form on infected branches



- All sizes and ages of Douglas-fir, grand fir and subalpine fir are most susceptible
- Individual trees are dying in the stand, tree crowns thinning; rare east of Continental Divide



- All sizes, ages, and species of trees
- Outer bark removed, exposing inner layers grooved with parallel teeth marks

particular site. Care for new trees by watering regularly and removing competing vegetation in a 1-foot diameter around trunk. Prevent browsing by livestock and wildlife.

- *Seek help when planning a timber sale to get top dollar, handle the various permits needed, and see that the remaining stand is in good shape when the harvest is over.*

For Help

- The Forest Stewardship Workshop Program will teach you how to do an inventory of your property and develop your own management plan. For workshop details, call Extension Forestry (243-2773).
- The Montana Department of State Lands' Private Forestry Assistance Program gives assistance to western Montana landowners setting up timber harvests and provides information about forestry Best Management Practices (BMP's). Request the *Forest Stewardship and Water Quality Guidelines* booklet.
- The USDA Soil Conservation Service and local conservation districts can provide assistance in developing a forest land grazing plan.
- Private forestry consultants can conduct forest inventories, set up timber sales, and help you achieve your forest management goals. (A directory of consultants is available from the Montana Department of State Lands.)

QUIZ About to Build?

	Y	N
Is the site in a floodplain or close to a stream?		
Could your access road cause slumping, scar the hillside, or cause sediment to enter a stream?		
Will your prospective homesite disturb wildlife habitat?		
Does your neighborhood lack covenants that will protect the land, water resources, and future aesthetics of the area?		

If you answered "yes" to all of the questions, WHOA—you have some planning to do.

What Is a "Conservation Easement"?

Montana is a great place to live! As more and more people are visiting, buying land, and moving here, the wide open spaces that make Montana so special are shrinking. You can help keep Montana the 'last best place' by considering a conservation easement on your property.

A conservation easement is a legal document between you and the easement holder that specifies what future uses will and **will not** be allowed on your property. The easement is attached to the deed for your property and remains with the property forever. The easement holder is responsible for ensuring that the terms of the easement are met in the future. Because some future development options are excluded, property taxes may be less.

If you want to take steps to sustain your land's rural agricultural qualities and to maintain wildlife habitat, contact the Montana Land Reliance, Nature Conservancy, or other local land trust organizations.

Tips For Planning A Homesite

- *Plan for minimum impact before building.*
- *Site homes and roads away from streams, on stable soils, and avoid steep slopes.*
- *Avoid disturbing wildlife corridors, wetlands, and riparian areas.*
- *Control your pets so they don't disturb or attract wildlife.*
- *Maintain or plant native vegetation.*
- *As a neighborhood working together, you can provide the vegetation diversity that birds, butterflies, and small and large mammals need for food, cover, and nesting: **(a)** plant small corner wood-lots, **(b)** establish shelterbelts edged with shrubs along property boundaries, **(c)** connect with meadows of native grasses or pasture land, **(d)** locate house and lawn in a corner of your property to minimize wildlife disturbance.*

WHAT You Need To Know As A Montana Landowner

WATER RIGHTS - You must have a water use permit before diverting, withdrawing, impounding or distributing any surface water (or groundwater at rates of 35 gallons per minute or more).

PROTECTION OF STREAMBED AND BANKS - You must have a permit before doing any activity that modifies the stream channel or streambanks.

WHO To Contact

- Water Rights Bureau of the Department of Natural Resources and Conservation, Helena 444-6610
- County Conservation District
- U.S. Army Corps of Engineers, Helena 444-6670

Floodplain Protection - You must have a permit before doing any construction work in an area that would be inundated in a 100-year flood. Find out if you are in a floodplain.	• County Floodplain Coordinator or the Floodplain Mgmt. Section, Dept. of Natural Resources and Conservation 444-6654
Control of Noxious Weeds - All counties have laws requiring you to control noxious weeds. Find out which weeds are noxious in your county and how best to control them.	• County weed control district • County extension office
Septic System Installation - Counties regulate septic system installation, including the minimum acceptable distance between your septic system and drinking wells, streams, and groundwater. Counties also approve the septic system design, capacity, and type of soil used to treat your wastes.	• County health department or planning office
City/County Zoning - Before building, contact your city (if you are within city limits) or your county planning office to obtain a zoning compliance permit.	• City or county planning office
Water Quality Protection - You are responsible for preventing livestock manure, pesticides, sediment and other pollutants from reaching waterways.	• Water Quality Bureau of the Department of Health and Environmental Sciences (DHES), Helena 444-2406
Wetlands Protection - You must have a permit to fill, drain, or dredge any waters of the U.S., including wetlands.	• U.S. Army Corps of Engineers, Helena 444-6670 • Water Quality Bureau/DHES, Helena 444-2406 • USDA Soil Conservation Service Field Offices (to identify wetlands)
Stocking Fish in Your Pond - You will need a permit to stock any species of fish in a private pond.	• Dept. of Fish, Wildlife and Parks, Helena 444-2449
Forest Practices - In streamside areas, seven forest practices (clearcutting, burning, road construction, etc.) are prohibited on timber sales within a zone of 50 to 100 feet on each side of a stream, lake, or other body of water. A hazard reduction agreement is required before harvesting any timber.	• Dept. of State Lands, Missoula 542-4300
Other Land and Water Protection Measures - Find out if your city or county has special ordinances, such as a Sediment and Erosion Control Ordinance that limits erosion resulting from construction, timber harvest, farming, etc., or an Aquifer Protection Ordinance that protects drinking water wells from contamination, or any type of ordinance that may affect your proposed activity.	• City/county planning office • Water quality district • Conservation district
Air Quality Protection - Counties determine the best time of year for open burning to minimize deterioration of local air quality and may restrict the use of woodstoves & fireplaces.	• County health department or local fire department
Open Range - Montana is an open range state. Adjacent landowners are equally responsible to maintain the fences between them. As a general rule, fence your property to keep range livestock out and your animals in. It is unlawful for dogs and other predators to harass, kill, or wound cattle, horses, sheep and other livestock.	• Department of Livestock, Helena 444-2023

Inquire about other laws that may apply to your property or proposed activities

HELP

Maintain WHAT'S BEST about MONTANA

- *Productive agricultural land*
- *Wildlife*
- *Clear streams*
- *Native plants*
- *Healthy forests*

About This Publication

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